ABSTRACT BOOK

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Combining acrylonitrile air measurements and human biological monitoring in integratedenvironmental health assessments

A case-study following a major train accident in Belgium

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Background/Aim

On May 4, 2013, a train loaded with several tons of acrylonitrile (ACN) derailed in the village of Wetteren (Belgium), leading to the evacuation of 2000 residents. In a previous study, we have presented the results of the measurements of N-2-cyanoethylvaline in the residents and the associated health symptoms. In this study, we describe the pattern of the acrylonitrile measures in the air.

Methods

Security perimeters were delimitated in function of the physicochemical characteristics of ACN by the Crisis Management Cell. To monitor environmental exposure, in- and outdoor ACN air samples were collected by the firemen from May 4 –24. Drager CDS kits and photoionization detectors were used. For the analyses, ACN concentrations were divided in 4 categories in ppm (INERIS, 2008), i.e. immediate hazard (>90), risk (22 ≤ ppm ≤ 90), vigilance (4 ≤ ppm ≤ 21), and below the safety threshold (<4).

Results

On the integrated map of the period May 4-24, presenting the highest value for each measuring point, the highest CAN values were seen downwind of the train accident and in parallel with the sewerage system. From the day-by-day mapping, it became clear that ACN followed the trajectory of the railway, the gravitational sewerage network, and ended up in the water treatment plant. Maximum values of ACN were seen in the sewerage system (330ppm) and the streets (196ppm), followed by the public buildings (107ppm) and the houses (54ppm). Both in the public buildings and the houses, the toilets were the rooms with the highest observed concentrations.

Conclusions

The patterns as seen on the basis of the ACN air measurements were in perfect agreement with the ones observed previously in the HBM study. This study shows the added value of integrated risk and health impact assessments in disaster management of chemical incidents.